

3500/92 Communication Gateway

Datasheet

Bently Nevada Machinery Condition Monitoring

141542 Rev. L



Description

The 3500/92 Communication Gateway module provides extensive communication capabilities of all rack monitored values and statuses for integration with process control and other automation systems using both Ethernet TCP/IP and serial (RS232/RS422/RS485) communications capabilities. It also permits Ethernet communications with 3500 Rack Configuration Software and Data Acquisition Software.

Supported protocols include:

- Modicon Modbus protocol (via serial communications)
- Modbus/TCP protocol (a variant of serial Modbus used for TCP/IP Ethernet communications)
- Proprietary Bently Nevada protocol (for communication with 3500 Rack Configuration and Data Acquisition Software packages)



The Ethernet connection to the 3500/92 is an RJ45 connection for 10BASE-T star configuration Ethernet networks.

The 3500/92 supports the communication interfaces, communication protocols, and other features from the original 3500/90 with the exception of the primary value Modbus registers. The 3500/92 now has a Configurable Modbus Register Utility, which can provide the same functionality originally addressed by the primary value Modbus registers.



Specifications

Inputs

| | |
|-------------------|---|
| Power Consumption | <p>5.0 watts typical with ModbusRS232/ RS422 I/O Module</p> <p>5.6 watts typical with Modbus RS485 I/O Module</p> |
| Data Types | <p>Collects data from other modules in the rack, such as current measured values with time stamp, module statuses, and current alarm statuses, via a high speed internal network.</p> <p>Exact data types returned depend on module type and channel configuration.</p> <p>Update Time: The data collection rate depends on rack configuration but will not exceed 1 second for all modules in the 3500 rack.</p> |

Outputs

| | |
|-----------|--|
| OK LED | Indicates when the 3500/92 is operating properly. |
| TX/RX LED | Indicates when the 3500/92 is communicating with other modules in the 3500 rack. |

Protocols

| | |
|--------------------|---|
| BNC Host Protocol | Communication with 3500 Configuration Software and 3500 Data Acquisition and Display Software over Ethernet TCP/IP. |
| Modbus | Based on AEG Modicon PI-MBUS-300 Reference Manual. Uses Remote Terminal Unit (RTU) transmission mode. |
| Ethernet | |
| Communication Link | Ethernet, 10Mbps, and conforms to IEEE802.3 |
| Protocol | Ethernet TCP/IP frame and Modbus/TCP |
| Connection | RJ-45 (telephone jack style) for 10BASE-T Ethernet cabling |

Environmental Limits

| | |
|----------------------------|---|
| Main and I/O Module | |
| Operating Temperature | -30 °C to +65 °C (-22 °F to +149 °F) |
| Storage Temperature | -40 °C to +85 °C (-40 °F to +185 °F) |
| Humidity | 95%, non-condensing |

Physical

| | |
|-------------------------------------|--|
| Main Board | |
| Dimensions (Height x Width x Depth) | 241 mm x 24.4 mm x 242 mm (9.50 in x 0.96 in x 9.52 in) |
| Weight | 0.82 kg (1.8 lb.) |

I/O Modules

| | |
|---|---|
| Dimensions (Height x Width x Depth) | 241 mm x 24.4 mm x 99.1 mm (9.50 in x 0.96 in x 3.90 in) |
| Weight | 0.44 kg (0.96 lb.) |

Rack Space Requirements

| | |
|----------------|--------------------------|
| Monitor Module | 1 full-height front slot |
| I/O Modules | 1 full-height rear slot |

Compliance and Certifications (Approvals Pending)

FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

EMC

European Community Directive:

EMC Directive 2014/30/EU

Standards:

EN 61000-6-2; Immunity for Industrial Environments
EN 61000-6-4; Emissions for Industrial Environments

Electrical Safety

European Community Directive:

LV Directive 2014/35/EU

Standards:

EN 61010-1

RoHS

European Community Directive:

RoHS Directive 2011/65/EU

Cyber Security

Designed to meet IEC 62443

Maritime

DNV GL rules for classification – Ships, offshore units, and high speed and light craft

ABS Rules for Condition of Classification, Part 1

- Steel Vessels Rules
- Offshore Units and Structures

Functional Safety

SIL 2

Hazardous Area Approvals



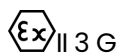
For the detailed listing of country and product specific approvals, refer to the *Approvals Quick Reference Guide* (108M1756) available from Bently.com.

cNRTLus

Class I, Zone 2: AEx/Ex nA nC ic IIC T4 Gc;
Class I, Zone 2: AEx/Ex ec nC ic IIC T4 Gc;
Class I, Division 2, Groups A, B, C, and D;

T4 @ Ta= -20°C to +65°C (-4°F to +149°F)
When installed per drawing 149243 or 149244.

ATEX/IECEx



Ex nA nC ic IIC T4 Gc
Ex ec nC ic IIC T4 Gc

T4 @ Ta= -20°C to +65°C
(-4°F to +149°F)
When installed per drawing 149243 or
149244.

Ordering Information

For the detailed listing of country and product specific approvals, refer to the *Approvals Quick Reference Guide* (108M1756) available from Bently.com.

3500/92 Communication Gateway 3500/92-AA-BB-CC

A: I/O Module Type

| | |
|-----------|----------------------------------|
| 01 | ModbusRS232/RS422 I/O Module |
| 02 | ModbusRS485 I/O Module |
| 03 | Ethernet/RS232 Modbus I/O Module |
| 04 | Ethernet/RS485 Modbus I/O Module |

B: Memory Type

| | |
|-----------|------------|
| 01 | Low Memory |
|-----------|------------|

C: Agency Approval Option

| | |
|-----------|----------------|
| 00 | None |
| 01 | CSA/NRTL/C |
| 02 | CSA/ATEX/IECEX |

Additional Options

Firmware

126M4118-01 Firmware Upgrade Kit



Older Communication Gateway modules will require a Firmware Upgrade to communication with a new I/O Module. See 3500/92 manual for detailed information.

Cables

Standard 10BASE-T Shielded Category 5 Cable with RJ-45 connectors

138131-AAA

A: Length (in ft.) up to 320 ft in length.

| | |
|--------------|------------------------|
| 0 0 6 | 6 feet (1.8 meters) |
| 0 1 0 | 10 feet (3 meters) |
| 0 2 5 | 25 feet (7.3 meters) |
| 0 4 0 | 40 feet (12 meters) |
| 0 5 0 | 50 feet (15 meters) |
| 0 7 5 | 75 feet (22.5 meters) |
| 0 8 5 | 85 feet (25.5 meters) |
| 1 0 0 | 100 feet (30.5 meters) |
| 1 2 0 | 120 feet (36.6 meters) |
| 1 5 0 | 150 feet (44.8 meters) |
| 2 0 0 | 200 feet (61 meters) |
| 2 5 0 | 250 feet (75 meters) |
| 3 2 0 | 320 feet (98 meters) |



For specific cable lengths, please order through Bently Nevada Custom Products.



30 ft. - 100 ft. is ordered in 5ft. increments only. 100 ft. - 320 ft. is ordered in 10ft. increments only

Serial Cabling (RS232): RS232 Cable, Host to 3500/92

130419-AAAA-BB

A: Cable Length

| | |
|---------------------------------|------------------------|
| 0 0 1 0 | 10 feet (3 meters) |
| 0 0 2 5 | 25 feet (7.5 meters) |
| 0 0 5 0 | 50 feet (15 meters) |
| 0 1 0 0 | 100 feet (30.5 meters) |
| B: Assembly Instructions | |
| 0 1 | Not Assembled |
| 0 2 | Assembled |

RS232 Cable, Honeywell PLCG to 3500/92
130420 - AAAA-BB

A: Cable Length


| | |
|----------------|------------------------|
| 0 0 1 0 | 10 feet (3 meters) |
| 0 0 2 5 | 25 feet (7.5 meters) |
| 0 0 5 0 | 50 feet (15 meters) |
| 0 1 0 0 | 100 feet (30.5 meters) |

B: Assembly Instructions

| | |
|------------|---------------|
| 0 1 | Not Assembled |
| 0 2 | Assembled |

130119-01 RS232 Cable, Host Computer to RS232/RS422 Converter

Serial Cabling (RS422/RS485):

 RS422 Cables can be used for rack-to-rack connections when using ModbusRS485 I/O Modules. The final rack-to-host connection is application specific and may require a custom cable.

RS422 PVC Insulated Cable, RS232/RS422 Converter to 3500/92
130530 - AAAA-BB

A: Cable Length

| | |
|----------------|------------------------|
| 0 0 1 0 | 10 feet (3 meters) |
| 0 0 2 5 | 25 feet (7.5 meters) |
| 0 0 5 0 | 50 feet (15 meters) |
| 0 1 0 0 | 100 feet (30.5 meters) |
| 0 2 5 0 | 250 feet (75 meters) |
| 0 5 0 0 | 500 feet (150 meters) |

B: Assembly Instructions

| | |
|------------|---------------|
| 0 1 | Not Assembled |
| 0 2 | Assembled |

RS422 PVC Insulated Cable, 3500/92 to 3500/92
129665-AAAA-BB

A: Cable Length

| | |
|----------------|------------------------|
| 0 0 1 0 | 10 feet (3 meters) |
| 0 0 2 5 | 25 feet (7.5 meters) |
| 0 0 5 0 | 50 feet (15 meters) |
| 0 1 0 0 | 100 feet (30.5 meters) |
| 0 2 5 0 | 250 feet (75 meters) |
| 0 5 0 0 | 500 feet (150 meters) |

B: Assembly Instructions

| | |
|------------|---------------|
| 0 1 | Not Assembled |
| 0 2 | Assembled |

RS422 Teflon Insulated Cable, RS232/RS422 Converter to 3500/92

131109 – AAAA-BB

A: Cable Length

| | |
|---------|------------------------|
| 0 0 1 0 | 10 feet (3 meters) |
| 0 0 2 5 | 25 feet (7.5 meters) |
| 0 0 5 0 | 50 feet (15 meters) |
| 0 1 0 0 | 100 feet (30.5 meters) |
| 0 2 5 0 | 250 feet (75 meters) |
| 0 5 0 0 | 500 feet (150 meters) |

B: Assembly Instructions

| | |
|-----|---------------|
| 0 1 | Not Assembled |
| 0 2 | Assembled |

131108 – AAAA-BB

A: Cable Length

| | |
|---------|------------------------|
| 0 0 1 0 | 10 feet (3 meters) |
| 0 0 2 5 | 25 feet (7.5 meters) |
| 0 0 5 0 | 50 feet (15 meters) |
| 0 1 0 0 | 100 feet (30.5 meters) |
| 0 2 5 0 | 250 feet (75 meters) |
| 0 5 0 0 | 500 feet (150 meters) |

B: Assembly Instructions

| | |
|-----|---------------|
| 0 1 | Not Assembled |
| 0 2 | Assembled |

RS422/RS485 Extension Cable

130531 – AA – BB

Used with Cables 130530, 129665, 131109, and 131108 for lengths greater than 500 feet (152 meters).



Standard length is 500 feet (152 meters).

A: Assembly Instructions

| | |
|-----|---------------|
| 0 1 | Not Assembled |
| 0 2 | Assembled |

B: Insulation

| | |
|-----|-------------------|
| 0 1 | PVC Insulated |
| 0 2 | Teflon® Insulated |



The total RS485 cable run can be up to 4000 feet (1220 meters). The total RS422 cable run can be up to 4000 feet (1220 meters) between each rack

Spares

| Part Number | Description |
|-----------------|---|
| 04425545 | Grounding Wrist Strap (single use) |
| 137495-01 | Firmware IC (Odd bank) |
| 137494-01 | Firmware IC (Even bank) |
| 136180-01 | 3500/92 Communication Gateway Module. |
| 125736-01 | ModbusRS232/RS422 I/O Module. |
| 133323-01 | ModbusRS485 I/O Module. |
| 136188-01 | Ethernet/RS232 ModbusI/O Module * |
| 136188-02 | Ethernet/RS485 ModbusI/O Module * |
| Bently_ Manuals | International Technical Documentation DVD |

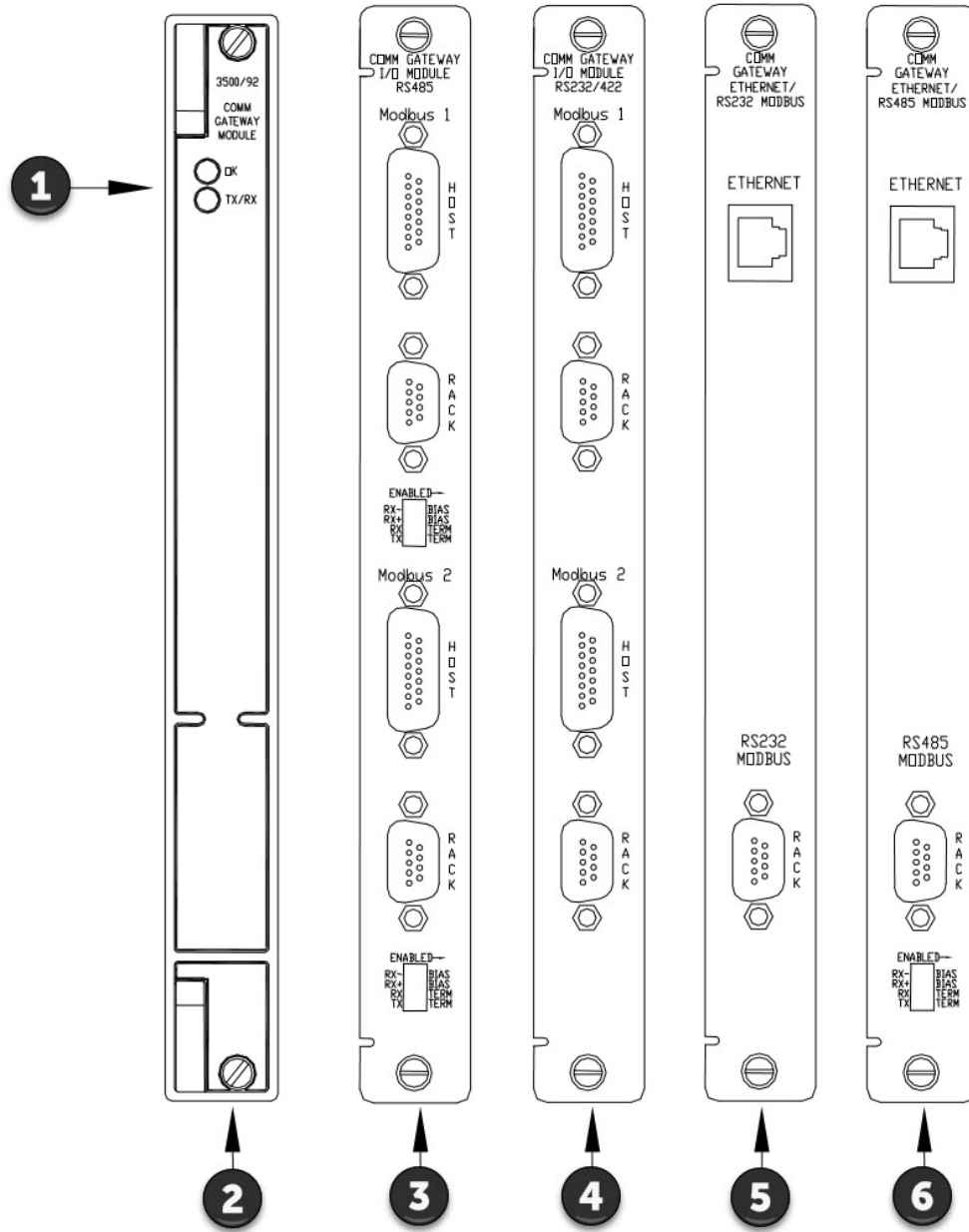


* These spares include the Firmware Upgrade Kit (126M4118-01).

Accessories

| Part Number | Description |
|--|---|
| 139036-01 | 9-pin D-SUB "Y" |
| Serial Converters | |
| 02230411 | RS232 to RS422 Converter - 110 Vac. |
| 02230412 | RS232 to RS422 Converter - 220 Vac. |
| Ethernet Hubs | |
| 165M2516 | 24-port 100/1000 SFP BE based switch |
| Ethernet Transceivers | |
| 02200260 | 15-Pin AUI male to Fiber Optic Cable (10BASE-FL) with ST connection |
| 02200261 | 15-Pin AUI male to Thinnet (10BASE2) |
| Ethernet Cabling - Standard 10 BASE-T Shielded , Category 5 Cable with RJ-45 Connectors | |
| 02175190 | 6 ft. Length |
| 02175191 | 10 ft. Length |
| 02175192 | 25 ft. Length |

Graphs and Figures



1. Status LEDs
2. Comm Gateway Module
3. RS485 I/O Module
4. RS232/422 I/O Module
5. Ethernet/RS232 I/O Module
6. Ethernet/RS485 I/O Module

Figure 1: Front and Rear Views of the 3500/92 Communication Gateway

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